



Four degrees and beyond: The potential for a global temperature increase of four degrees and its implications

Author(s): New M, Liverman D, Schroeder H, anderson K
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Abstract:

The 1992 UN Framework Convention on Climate Change commits signatories to preventing 'dangerous anthropogenic interference with the climate system', leaving unspecified the level of global warming that is dangerous. In the late 1990s, a limit of 2 degrees C global warming above preindustrial temperature was proposed as a 'guard rail' below which most of the dangerous climate impacts could be avoided. The 2009 Copenhagen Accord recognized the scientific view 'that the increase in global temperature should be below 2 degrees Celsius' despite growing views that this might be too high. At the same time, the continued rise in greenhouse gas emissions in the past decade and the delays in a comprehensive global emissions reduction agreement have made achieving this target extremely difficult, arguably impossible, raising the likelihood of global temperature rises of 3 degrees C or 4 degrees C within this century. Yet, there are few studies that assess the potential impacts and consequences of a warming of 4 degrees C or greater in a systematic manner. Papers in this themed issue provide an initial picture of the challenges facing a world that warms by 4 degrees C or more, and the difficulties ahead if warming is to be limited to 2 degrees C with any reasonable certainty. Across many sectors--coastal cities, agriculture, water stress, ecosystems, migration--the impacts and adaptation challenges at 4 degrees C will be larger than at 2 degrees C. In some cases, such as farming in sub-Saharan Africa, a +4 degrees C warming could result in the collapse of systems or require transformational adaptation out of systems, as we understand them today. The potential severity of impacts and the behavioural, institutional, societal and economic challenges involved in coping with these impacts argue for renewed efforts to reduce emissions, using all available mechanisms, to minimize the chances of high-end climate change. Yet at the same time, there is a need for accelerated and focused research that improves understanding of how the climate system might behave under a +4 degrees C warming, what the impacts of such changes might be and how best to adapt to what would be unprecedented changes in the world we live in.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2

Climate Change and Human Health Literature Portal

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Security, Food/Water Security, Precipitation, Sea Level Rise, Temperature

Food/Water Security: Agricultural Productivity

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

General Geographical Feature

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

General Health Impact

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Model/Methodology:

type of model used or methodology development is a focus of resource

Cost/Economic, Exposure Change Prediction

Resource Type:

format or standard characteristic of resource

Review

Timescale:

time period studied

Long-Term (>50 years)